Vertraulich
An
Siemens AG

ERFINDUNGSMELDUNG
Bitte verschlossen weitersenden!
Med BN 75

Aktenzeichen der GR PA
96E 8583

Ich/Wir (Vornamen u. Name der/des Erfinder/s, weitere Angaben u. Unterschrift/en auf Seite 4)
Dr. Douglas C. Schmidt, U. Dorn, D. Quehl, D. Becker, C. Scharf

Datum der Ausfertigung
31.5.96

melde/n hiermit die auf den Seiten 2 und 3 vollständig beschriebene Erfindung mit der Bezeichnung:
INDIGO – Interpretative Network Daemon Implemented by means of a GENERIC-Main Object

I. An Vorgesetzten des/der Erfinder/s — Dienststelle

Herrn/~~Frau~~ Dr. Wangler — BNSW

mit der Bitte, die nachstehenden Fragen zu beantworten:
a) Wann ging die Erfindungsmeldung bei Ihnen ein? →→→→→→→→→→→→→→
b) Geht die Erfindung auf öffentlich geförderte Arbeiten zurück?

☒ nein ☐ ja, Projekt (Vorhaben)_____

Eingang am:

Ab Eingang läuft gesetzliche Frist!

1.7.96 Wangler
(Datum) (Unterschrift des Vorgesetzten) → **Bitte bei Zuständigkeit auch zu Ziffer III.Stellung nehmen.**

II. **Bitte wegen gesetzlicher Frist sofort weiterleiten:**

An Patentabteilung (ZFE GR PA)

zur weiteren Veranlassung.

Eingang am:
ZFE GR ZD VE
Eing. 24. JULI 1996
GR

III. An Werks- bzw. Abteilungsleitung

BNSW Herrn/~~Frau~~ Dr. Wangler

zur Entscheidung bzw. Empfehlung über Inanspruchnahme (Zutreffendes bitte ankreuzen!):

☒ Die Erfindung sollte unbeschränkt in Anspruch genommen werden
Kosten trägt (Werk/Abt., Konto): BNSW 362

☐ Die Erfindung kommt für eine Behandlung als Betriebsgeheimnis in Betracht.

☒ Die Erfindung kommt evtl. für Auslandsanmeldungen in Betracht.

☐ Die Erfindung wird voraussichtlich nicht benutzt.
Bei Freigabe wäre aber ein Benutzungsrecht wünschenswert.

☐ Die Erfindung kann dem/den Erfinder/n vorbehaltslos freigegeben werden.

☐ Die Erfindung betrifft nicht unser Interessengebiet. Es sind noch folgende Dienststellen zu befragen:_____

19.07.96 Wangler
(Datum) (Unterschrift der Werks- bzw. Abteilungsleitung)

Dringlichkeitsvermerk

Eingang am:

Vermerke der ZFE GR PA
* Bitte vertragliche Vereinbarung mit Dr. Schmidt treffen u. ggf. Bestätigung der Erfindungsmeldg.
SD
30.7.96

IV. Zurückerbeten an ZFE GR PA

APPENDIX A

1. Welches technische Problem soll durch Ihre Erfindung gelöst werden? Main() - Program of a running Executeable

2. Wie wurde dieses Problem bisher gelöst? only source code approach known!

3. In welcher Weise löst Ihre Erfindung das angegebene technische Problem?

See appendix!

The principal new approach is delivering only a binary executeable including all of the following features:

a.) Objectoriented

b.) proper hidden instantiation of processwide Singleton-objects e.g. for:
- basic network-communication features with ATOMIC (see ATOMIC Erfindungsmeldung 31.5.95 GR 95E3632DE)
- basic sync/async Management with SESAM (see SESAM Erfindungsmeldung 31.5.95 GR95E3631DE)
- basic dynamic (in/out) features for Component Dynamic Link Libraries (DLLs) (see Service Configuration Pattern, Douglas C. Schmidt)
- basic Networkwide Naming Support
- basic Networkwide Timeshare Support
- basic Networkwide Resource Locking Support
- basic Networkwide Message logging Support
- basic Operating System Abstraction Layer (OSAL)
- basic interface to a System Configuration Control Image (SCCI)

c.) Support of full duplex Event and Request/Response Channels

d.) Generic Connection to dominant full-Framework supported Main()-Programms (Message Pump interconnection Protocol (MPIP))

e.) Generic Connection to Device-Drivers

f.) Generic Support of an Object-Dump-Database (Debugging Port) (see External Polymorphism pattern, Douglas C. Schmidt)

This is a completely Domain-Software independent Linkable Module, which can be dynamically configured by Domain-Components

INDIGO - Interpretative Network Daemon Implemented by means of a GENERIC-Main Object

The principal new approach is delivering only a binary executeable including all of the following features:

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   - basic network-communication features with ATOMIC (see ATOMIC Erfindungsmeldung 31.5.95, GR 95 E 3632 DE)
   - basic sync/async Management with SESAM (see SESAM Erfindungsmeldung 31.5.95, GR 95 E 3631 DE)
   - basic dynamic linking features for component Dynamic Link Libraries (DLLs)
     (see Service Configuration Pattern, Douglas C. Schmidt)
   - basic Networkwide Naming Support
   - basic Networkwide Time Base Support
   - basic Networkwide Resource Looking Support
   - basic Networkwide Message Logging Support
   - basic Operating System Abstraction Layer (OSAL)
   - basic interface to a system configuration Control (SCCM)

c) Support of fullduplex Event and Request /Response Channels

d) Generic Connection to dominant GUI-Framework Supported Main ( ) Programms (Message Pump Interconnection Protocol (MPIP))

e) Generic Connection to Device-Drivers

f) Generic Support of an Object-...-Database (Debugging Port) (see External Polymerphil pattern, Douglas C. Schmidt)

This is a completely Domain-Software independent main Module, which can be dynamically (re-) configurated by Domain-component-DLLs at Runtime.

INDIGO -

A Generic Main Approach

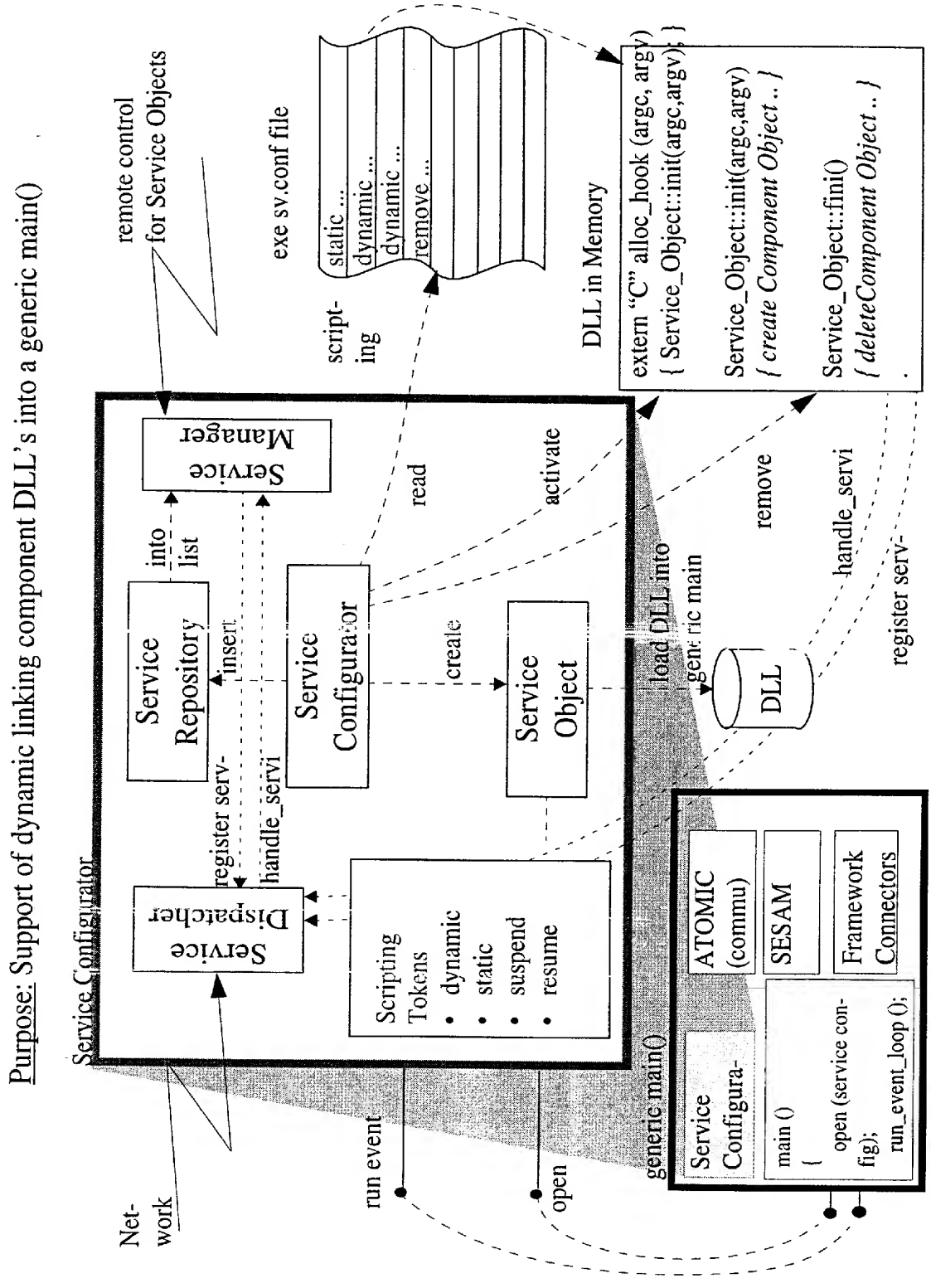
Indigo is based on the Service Configuration pattern.

The Service Configurator pattern offers the following benefits:

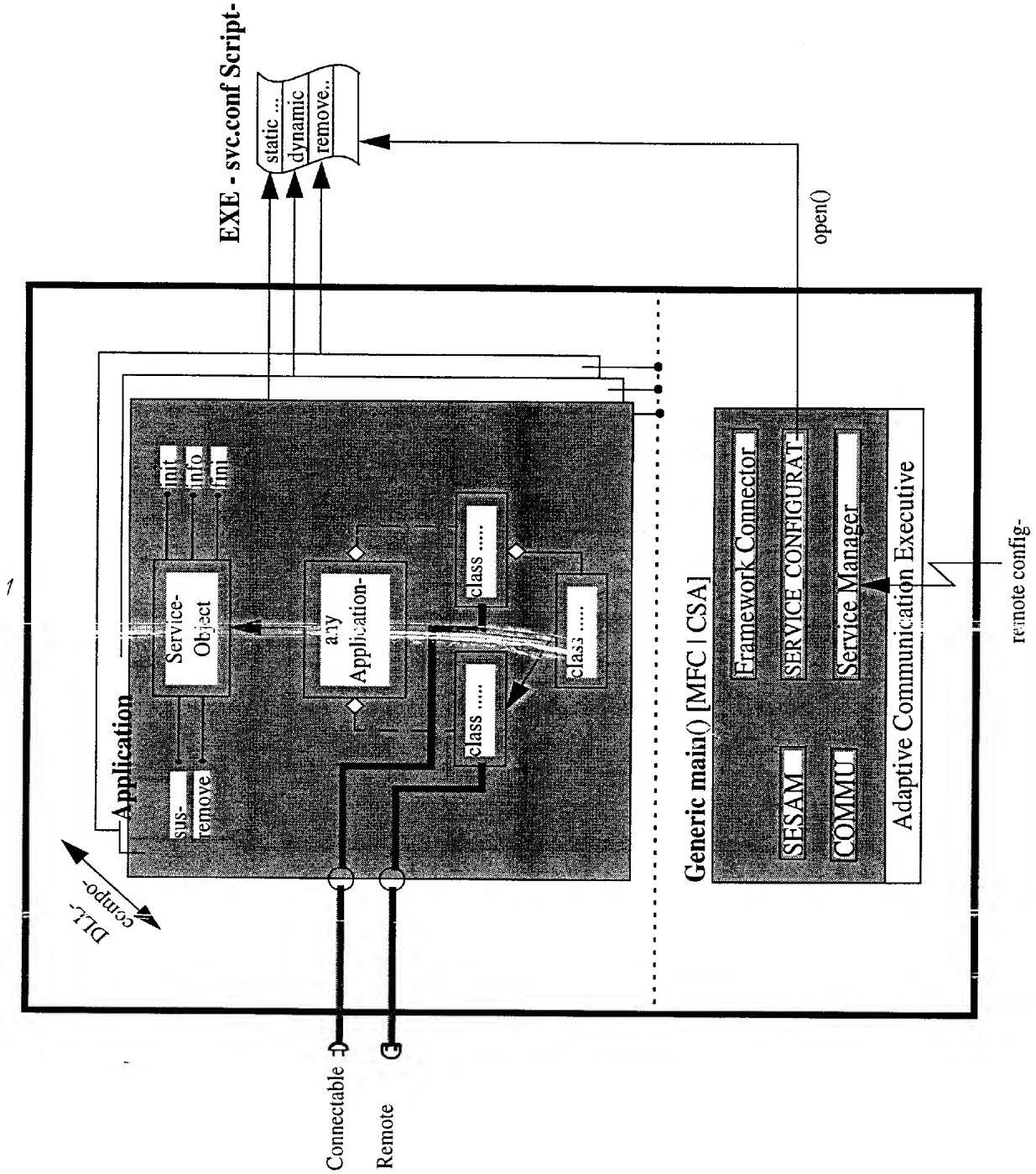
- Centralized administration: The pattern combines one or more services to a single administrative unit. This simplifies development by automatically performing common service initialization and termination activities (eg.. opening and closing files). It also makes it possible to centralize the administration of network services by using a uniform set of configuration operations such as *initialize*, *suspend*, *resume* and *terminate* and query apllication component.
- Increased modularity and reuse: The pattern helps to decouple the implementation of services from the configuration of these services and thus improves the modularity and reusability of those. As said above, all services have a uniform interface by which they are configured. This also encourages reuse.
- Increased Configuration dynamism: The pattern makes it possible to dynamically reconfigure a components without modifying, recompiling or relinking existing code. In addition to that it is possible to reconfigure a component or other components without influencing other co-located components.
- Increased opportunity for tuning and optimization: The pattern moves up the range of configuration alternatives available to developers. Services functionality is decoupled from the execution agent (the Indigo generic main) used in order to invoke the service. Therefore developers can adaptively tune daemon concurrency levels to meet client demands. Some alternatives include spawning a thread or process at the arrival of a client request or at creation time.
- Increase security of executables in avoiding the usage of process global data. Users can bring in functionality into the Generic Main only in components, which have a set of initialisation and finalisation hooks.

The following pictures show the principals.

1 Service Configurator Pattern



2 Executable Template



The following figure shows how the Generic Main is enriched by a Sync/Async Management pattern (SESAM)

5 Generic Main and MFC-ACE Framework Interaction - reflective Adaption of the Generic Main as a connector to 3rd part Main-Moduls

There are two goalsof the Generic Main:

- Interconnecting Frameworks (ACE and MFC)
- Creating a main-program wich can never be changed by an application programmer

5.1 Interconnecting Frameworks

The following figure shows the coupling of the MFC and the ACE Main Message Pumps. Every Thread has got it's own message pump. The message pump of the MFC is hidden behind the scenes, the message pump of the ACE is attached to an ACE_Task object.

5.1.1 MFC->ACE Communication

An abstract base class implements a generic main base functionality which could be extended by deriving from this class a adding functionality.
Especially the both hook-functions of the Generic Main base class are very helpful. You could place could befor the dispatch loop will satart and the second hook will be called after the dispatch loop is ready.

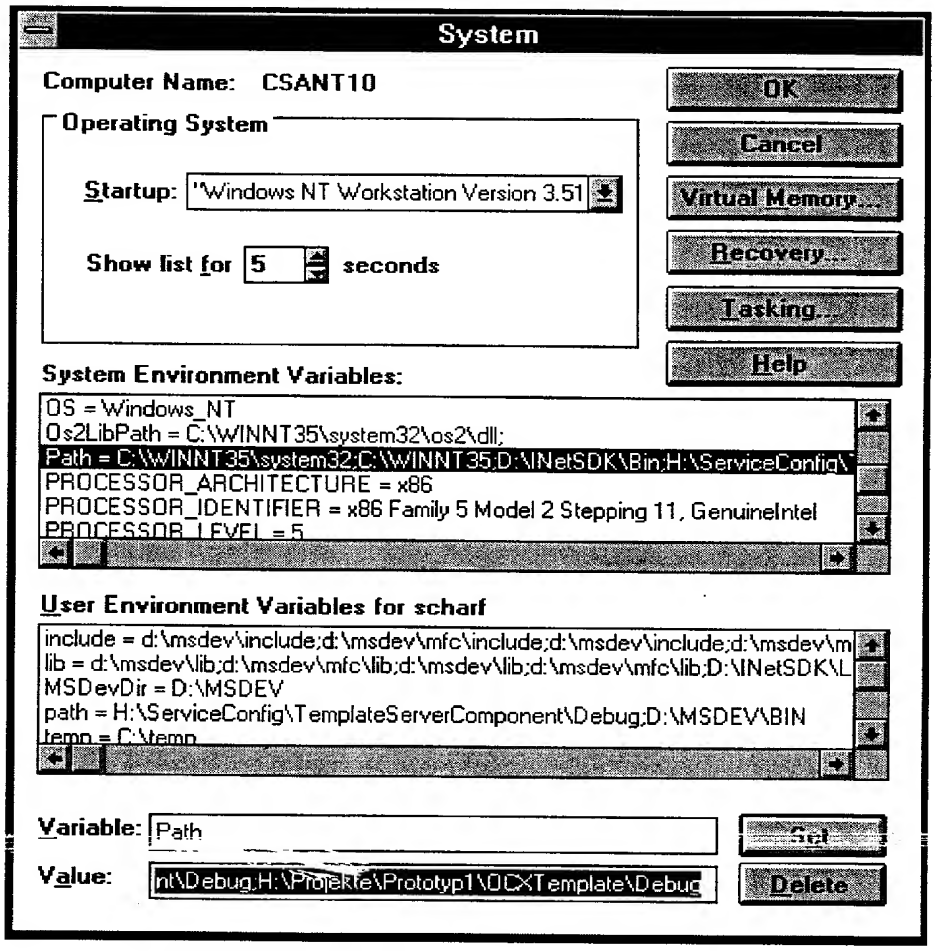
This way we use functionality from the MFC framework. The entry point here is the Post-Message methode.

The notification of this method looks like:

```
BOOL PostMessage(
HWND  hWnd,// handle of destination window
   UINT  Msg,// message to post
   WPARAM  wParam,// first message parameter
   LPARAM  lParam // second message parameter
);
```

What is the meaning of the parameters?

- **HWND hwnd**: This is the handle of the recipient window
- **UINT msg**: This is the identifier of the user defined message..
- **WPARAM wparam**: First parameter of the message.
- **LPARAM lparam**: Second paramter of the message. Used to transfer the name of the loaded components from ACE to MFC.



The runtime linker uses the path environment variable to search for DLLs and OCXs. Thus it is required to enter the path of the component into the path-variable.
This window is part of Main/Control Panel/System of the Microsoft-NT platform.

The following figure shows a running Machine snapshot, where different Generic Mains are running, configured by various component DLLs.

7 Application Templates to support Service Configuration into Generic Main

Modern operating systems, e.g. Windows NT, provide support for dynamically configurable kernel-level device drivers. Similar to that, CSA provides different program components in *OCX* format. These can be linked into and unlinked out of the application dynamically. This makes it possible to reconfigure the application without having to recompile and relink new components into the application.

The way this is achieved is by the use of the *Service Configurator Pattern.* The Service Configuration pattern resolves the following issues:

- *The need to defer the selection of a particular type, or a particular implementation, of a service until very late in the design cycle* - This allows developers to concentrate on the functionality of a service, without commiting themselves prematurely to a particular service configuration. By decoupling functionality the Service Configuration pattern permits applications to evolve independently of the configuration policies and mechanism by the system.
- *The need to build complete applications or systems by composing multiple independently developed services* - The Service Configuration pattern requires all services to have a uniform interface. This allows the services to be treated as building blocks which can be easily put together as components of a large application. The uniform interface across all the services makes them "look and feel" the same with respect to how they are configured and this makes developing applications simpler.
- *The need to optimize, reconfigure and control the behavior of a service at run-time* - Decoupling the implementation of a service from its configuration makes it possible to fine-tune certain implementation or configuration parameters of services. For instance, depending on the parallelism available on the hardware and operating system, it may be more or less efficient to run one or more services in seperate threads or processes. The Service Configuration pattern enables applications to control these behaviors at run-time, when more information may be available to help optimize the services.

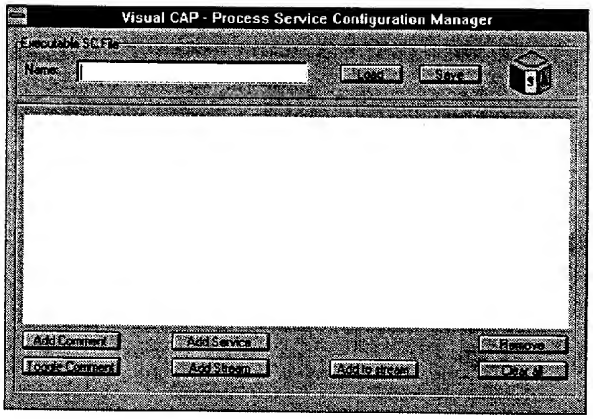
(from P. Jain and D.C. Schmidt, Service Configurator, A Pattern for Dynamic Configuration and Reconfiguration of Communication Services)

The *Service Configuration framework* uses a configuration file (e.g. *svc.conf*) to guide the configuration and reconfiguration activities of a process. Each of this processes has therefore to be associated with a distinct configuration file.

Each *service config entry* in the file begins with a *service config directive* that specifies the action to perform. Each entry contains certain attributes that indicate the location of the shared object file for each dynamically linked object and parameters as well. The latter may be needed to initialize the service at runtime.

8 Program description of SVCman

The Service Configuration Manager is a software-tool that allows you to create and modify your Service Config files in a comfortable way.



According to the `Service Configurator Framework` the SVCman supports the following Service Config Directives:

symbol	description
dynamic	Dynamically link and enable a service
static	Enable a statically linked service
remove	Completely remove a service
suspend	Suspend service without removing it
resume	Resume a previously suspended service
stream	Configure a stream into a deamon
string	Configure a remote facility

***Table 1:** Service Config Directives*

In addition to that the SVCman is also designed to work with a ProcessManager, that allows you to define and change the configuration for a specific process dynamically.
If the corresponding process of the current Service Config file is not running, this is not a problem at all. In this case the Service Config file will only be written to disk and the changes take effect when the process is started the next time. Nevertheless the old file will be saved as `*.old` file.
If the process is currently running and the changes should take effect in advance one has to develop an alternative. The SVCman then generates a Delta file (`*.delta`)which holds the necessary directives to bring the `Service Configuration Framework` to the changed status. When the process is started the next time, it will be of course defined corresponding to the new Service Config file.

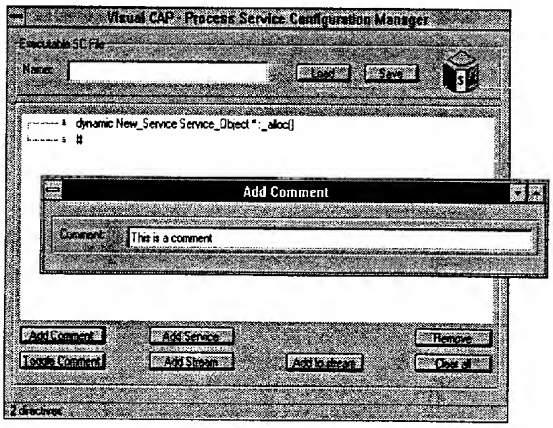
Entry	Description
Function	Name of function of the service entry in the DLL
Status	Status of service (active, inactive)
Parameter	optional parameterstring

Table 2: Description of entry-fields

- Note that the Enter key will act as the Window-Close button and thus close the form. You do not have to press Enter at the end of each entry-field. The changes you make will be updated in any case.
- The `Browse` button helps you to find the correct name of the library by showing you a list of the currently avaible ones in the specified path.
- According to naming conventions there must not be blanks (SPACE) inside name-fields, these are therefore depressed.
- As the `Service Configurator Framework` uses double quotes (") to indicate the start and the end of a parameter there must not be double quotes inside the parameter-field. They are therefore depressed.
- For a correct definition of a service all fields in the form have to be filled. Several types of services do require only one or two entries. The not required ones are disabled by program.
- During editing the Service Property form, the main form is disabled.

9.2.2 Add Comment

With Add Comment you can simply mark a line for comment and thus give some remarks on the entries of the config-file. This clearly enhances the readability of the file.



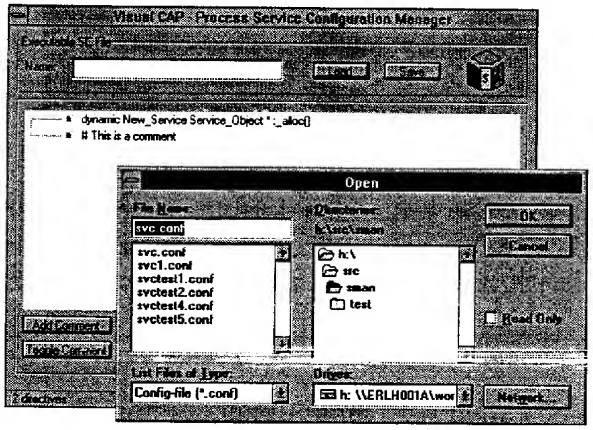
9.2.8 Clear all

Use this Button to clear all entries and reset all.

- Note that there is no UNDELETE, so be careful.
- The filename will also be cleared and you will have to define a new one when you want to save the file.

9.3 ... Save a `config` file

After editing or changing the file you can save your `config` file to disk. A common Windows Dialogbox will be opened and you have to specify the path and filename.



- The file will be stored as `svc.conf` by default.
- If you have specified a different filename, the executable has to have the - f FILEPATH-FILENAME given or a Process Start Parameter
- If there is an existing file on disk it will be renamed into `*.old`, so you will not loose it and can restore it

Note:

As said above, the SVCman is also designed to work with a ProcessManager, that allows to define the configuration for a specific process dynamically. If therefore the correnspondingprocess of the changed Service Config file is running, you will be asked if the changes you made should take effect in advance or not.

```
/*[ Compilation unit ----------------------------------------------------

   Component       : CSA -

   Name            : CsaGenericMainBas.h

   Author          : (D. Quehl, BNEP11, +49 9131 84 2430); Siemens AG B Med CSA

   Language        : C/C++

   Creation Date   : 19-JUN-1996

   Test State      :

   Description     : Definition of Generic Main functionality.

   Requirement Key : os_os_process_mgr



-----------------------------------------------------------------------------*/
/*] END */
#ifndef CSAGENERICMAINBAS_H
#define CSAGENERICMAINBAS_H

#pragma comment ( exestr,"@(#) CsaGenericMainBas.h 1.2 (10 Jul 1996)  : Definition Generic Main Base class" )

#include <ace/OS.h>
#include <ace/Task.h>
#include <ace/Synch.h>
#include <ace/Synch_T.h>

#include <CsaCommon/CsaDefs.h>
#include  <osc/CsaOscNlsMessageId.h>



/*[ Data type -----------------------------------------------------------

  Name        : CSA_STATUS - macro for Msc component

  Description : Macro for error Handling
                -- uses status as Input
                -- hides setting of Line and File

-----------------------------------------------------------------------------*/
#ifndef CSA_ERH_DISABLE
#include  <erh/CsaStatus.h>
#define   CSA_STATUS_gmain(status) { csaStatus->set(status,__FILE__,__LINE__);}
#else
#define   CSA_STATUS_gmain(status) ;
#endif    // #ifdef CSA_ERH_DISABLE
#define CSA_STATUS_GMAIN(status) CSA_STATUS_gmain(CSA_OSC_MSC_##status)
```



```
/*] END Data type */



/*[ Data type -----------------------------------------------------------

  Name        : CSA_TRACE_IN - Macro redefinition.

  Description : Macro redefinition that disables method trace.

-----------------------------------------------------------------------------*/
#ifndef CSA_TRACE_DISABLE
#include        <erh/CsaTrace.h>
#else
#define   CSA_TRACE_IN(a)
#endif  // #ifndef CSA_TRACE_DISABLE

/*] END Data type */




/*[ Class ---------------------------------------------------------------

   Name            : CsaGenericMainBas

   Description     : CsaGenericMainBas provides the gereic main program
                     functionality. CsaGenericMainBas is derived from
                     ACE_Task<ACE_MT_SYNCH> to let the dispatch loop
                     run in either, the main (caller) thread or a
                     separate thread (task's svc method).

-----------------------------------------------------------------------------*/
class CsaGenericMainBas : public ACE_Task<ACE_MT_SYNCH> {

public:

  // Constructor/destructor
  CsaGenericMainBas(void);
  CsaGenericMainBas(int argc, char *argv[]);
  ~CsaGenericMainBas(void) {
    delete thrMgr_;
  };

  // Store commandline  arguments if instantiated using the default
  // constructor.
  void setArgs (int argc, char *argv[]) {
    argc_ = argc;
    argv_ = argv;
  }

  // handle SIGINT
  virtual int handle_signal (int signum);

  // Perform initialization steps for CsaGenericMainBas
```

```
  virtual int open (void *p = 0);

  // Invoke dispatch loop (a)synchronously.
  virtual int dispatchLoop(bool async = false);

  // synchronize on dispatcher termination
  virtual void sync(void);

  // break the loop
  virtual int endLoop(void);

  // hook methods that can be overloaded to insert functionality before
  // the loop starts and immediatly after the loop finished.
  virtual int loopHook1(void) { return 0; }
  virtual int loopHook2(void) { return 0; }

  // hook methods that can be overloaded to insert functionality prior
  // to deamon open and after daemon close.
  virtual int openHook(void) { return 0; }
  virtual int closeHook(void) { return 0; }

private:

  // The implementation of the main dispatch loop.
  virtual int svc (void);

  // The following methods are inherited from ACE_Task which defines
  // them as pure virtual methods.
  // They are not needed here and implemented returning instant error.
  // Subclasses of CsaGenericMainBas may overload them.
  virtual int put(ACE_Message_Block *, ACE_Time_Value * =0) {
    return -1;
  }
  virtual int close (unsigned long flags = 0) {
    return 0;
  }
  virtual int handle_input (ACE_HANDLE fd = ACE_INVALID_HANDLE) {
    return -1;
  }

  // The service configuration daemon
  ACE_Service_Config  daemon_;

  // Copy of the command line arguments
  int argc_;
  char **argv_;

  // Indicator for initialization state
  bool initialized_;

  // API lock that prevents loop from beeing called multiply
  // and synchronizes the termination of the thread that runs
  // the loop asynchronously with the caller thread.
  ACE_Thread_Mutex lock_;

  // provide ACE_task a thread manager
```



```
  ACE_Thread_Manager  *thrMgr_;

};

/*] END Class */


#endif  //ifndef CSAGENERICMAINBAS_H


/*[ Change header ---------------------------------------------------------

   Date         : 26. Jun 1996
   Version      : -
   Charm        : -
   Author       : D. Quehl (Qu); Siemens AG B Med CSA

   Description  : Initial release

]-----------------------------------------------------------------------*/


/*[ Change header ---------------------------------------------------------

   Date         : 07. Jul 1996
   Version      : 1.1
   Charm        : 2041
   Author       : D. Quehl (Qu); Siemens AG B Med CSA

   Description  : Changes in respect to code review component
                  "osc - generic main - 03.jul.96 "

]-----------------------------------------------------------------------*/
```

```
/*[ Compilation unit ----------------------------------------------------

   Component       : CSA -

   Name            : CsaGenericMainBas.cpp

   Author          : (D. Quehl, BNEP11, +49 9131 84 2430); Siemens AG B Med CSA

   Language        : C/C++

   Creation Date   : 19-JUN-1996

   Test State      :

   Description     : Implementation of the Generic Main functionality.

   Requirement Key : os_os_process_mgr, os_os_test_testability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-----------------------------------------------------------------------------*/
/*] END */


#pragma comment ( exestr, "@(#) CsaGenericMainBas.cpp 1.3 (10 Jul 1996)  : Implementation Generic Main Base class" )

#include <osc/CsaGenericMainBas.h>

/*[ Method --------------------------------------------------------------

   Name            : CsaGenericMainBas::CsaGenericMainBas

   Description     : Default constructor for CsaGenericMainBas.
                     Prior to starting the dispatch loop the
                     command line arguments must be stored using
                     the setArgs() method.
                     The constructor calls the open() method.

   Return          : none

-----------------------------------------------------------------------------*/
CsaGenericMainBas::CsaGenericMainBas(
                            void     // takes no arguments
                            )

/*] END Method */

  : argc_(0), argv_(0), initialized_(false)
{
  CSA_TRACE_IN ((CSA_OSC, "int CsaGenericMainBas::CsaGenericMainBas"));
  this->open();
}

/*[ Method --------------------------------------------------------------
```



```
   Name            : CsaGenericMainBas::CsaGenericMainBas

   Description     : Constructor for CsaGenericMainBas.
                     Stores the command line arguments and calls the open()
                     method.

   Return          : none

-----------------------------------------------------------------------------*/
CsaGenericMainBas::CsaGenericMainBas(
                            int argc,       // argument count
                            char *argv[]    // argument vector
                            )

/*] END Method */

  : initialized_(false)
{
  CSA_TRACE_IN ((CSA_OSC, "int CsaGenericMainBas::CsaGenericMainBas"));

  this->setArgs(argc,argv);
  this->open();
}


/*[ Method --------------------------------------------------------------

   Name            : CsaGenericMainBas::open

   Description     : Perform initialization steps for CsaGenericMainBas.
                     - Create our own thread manager

   Return          : 0                       success
                     -1                      error

-----------------------------------------------------------------------------*/
int CsaGenericMainBas::open (
                            void *p         // pointer for arbitrary use
                            )

/*] END Method */

{
  CSA_TRACE_IN ((CSA_OSC, "int CsaGenericMainBas::open"));

  if ((this->thrMgr_ = new ACE_Thread_Manager) == 0) {
    CSA_STATUS_GMAIN(NOMEM_NEW);
    return -1;
  }
  this->thr_mgr(thrMgr_);                   // pass thread manager to task

  return 0;
}

/*[ Method --------------------------------------------------------------
```

```
   Name            : CsaGenericMainBas::handle_signal

   Description     : The handle_signal() method is called on an incoming
                     SIGINT.
                     handle_signal() calls endLoop() to terminate dispatching.

   Return          : 0                         success
                     -1                        error

-------------------------------------------------------------------------------*/
int CsaGenericMainBas::handle_signal (
                                int signum // signal number that caused invokation
                                )

/*] END Method */

{
  CSA_TRACE_IN ((CSA_OSC, "int CsaGenericMainBas::handle_signal"));

  if (this->thrMgr_ != 0)
    return this->endLoop();

  CSA_STATUS_GMAIN(NOMEM_NEW);
  return -1;
}

/*[ Method ---------------------------------------------------------------------

   Name            : CsaGenericMainBas::svc

   Description     : The svc() method implementation of the main dispatch loop.
                     After starting the ACE_Service_Config daemon with the
                     stored command line arguments the first hook method is
                     called and - if this hook returns success - the dispatch
                     loop invoked.
                     Immediately after returning from the dispatch loop the
                     second hook method is called to perform subclass specific
                     cleanup actions while the ACE_Service_Config is still up.


   Return          : 0                         success
                     -1                        error

-------------------------------------------------------------------------------*/
int CsaGenericMainBas::svc (
                        void                // takes no arguments
                        )

/*] END Method */

{
  CSA_TRACE_IN ((CSA_OSC, "int CsaGenericMainBas::svc"));

  // return error if thread manager creation failed in open()
  if (this->thrMgr_ == 0) {
    CSA_STATUS_GMAIN(NOMEM_NEW);
```



```
    return -1;
  }

  // Lock the access to the dispatch loop
  ACE_TSS_Guard<ACE_Thread_Mutex> mon (this->lock_);

   // make us owner of the reactor
  ACE_Service_Config::reactor()->owner(ACE_Thread::self());

 // invoke the startHook
  if (this->openHook() == -1)
    return -1;

  // Start the daemon
  ACE_SEH_TRY {
    if (this->daemon_.open (this->argc_, this->argv_) == -1) {
      CSA_STATUS_GMAIN(NO_REACTOR);
      return -1;
    }
  }
  ACE_SEH_EXCEPT(EXCEPTION_EXECUTE_HANDLER) {
    cout << "Caught structured exception while opening Service_Config daemon" << endl;
  }

  // Register this to the reactor to receive SIGINT
  if (ACE_Service_Config::reactor()->register_handler (SIGINT, this) == -1) {
    CSA_STATUS_GMAIN(REGISTER_HANDLER);
    (void)this->daemon_.close();
    return -1;
  }

  // Call the first hook; fall through if hook returns an error
  if (this->loopHook1() >= 0) {
    initialized_ = true;
    ACE_SEH_TRY {
      ACE_Service_Config::run_event_loop ();
    }
    ACE_SEH_EXCEPT(EXCEPTION_EXECUTE_HANDLER) {
      cout << "Caught structured exception while running Service_Config event loop" << endl;
    }
    (void)this->loopHook2();
  }

  int status;

  // Close down the services of daemon
  ACE_SEH_TRY {
    status = this->daemon_.close_svc();
  }
  ACE_SEH_EXCEPT(EXCEPTION_EXECUTE_HANDLER) {
    cout << "Caught structured exception while closing down Service_Config daemon" << endl;
  }

  // invoke the close hook
  (void)this->closeHook();
```

```
  // Close down the memory of daemon
  status = this->daemon_.close_mem();

  initialized_ = false;

  return status;
}

/*[ Method ----------------------------------------------------------------

   Name            : CsaGenericMainBas::dispatchLoop

   Description     : Invoke dispatch loop either synchronously (in the context
                     of the caller thread) or asynchronously (using
                     ACE_TASK::activate() to create a separate thread).

   Return          : 0                         success
                     -1                        error

----------------------------------------------------------------------------*/
int CsaGenericMainBas::dispatchLoop(
                               bool async   // flag for asynchronous invokation
                               )

/*] END Method */

{

  // return error if thread manager creation failed in open()
  if (this->thrMgr_ == 0) {
    CSA_STATUS_QMAIN(NOMEM_NEW);
    return -1;
  }

  // check whether initialization was already set
  if (!initialized_) {

    // for synchronous operation just invoke svc method in the context
    // of the caller's thread.
    if (!async)
      return this->svc();

    // for asynchronous operation invoke svc method in the context
    // of a thread created by activate().
    else
      return this->activate();
  }

  // Return error if invoked twice.
  return -1;
}


/*[ Method ----------------------------------------------------------------

   Name            : CsaGenericMainBas::endLoop
```



```
   Description     : Stop dispatching.

   Return          : 0                         success
                     -1                        error

----------------------------------------------------------------------------*/
int CsaGenericMainBas::endLoop(
                               void            // takes no arguments
                               )

/*] END Method */

{
  ACE_Service_Config::end_event_loop();
  return 0;
}


/*[ Method ----------------------------------------------------------------

   Name            : CsaGenericMainBas::sync

   Description     : Synchronize on dispatcher thread finished

   Return          : none

----------------------------------------------------------------------------*/
void CsaGenericMainBas::sync(
                               void            // takes no arguments
                               )

/*] END Method */

{
  if (this->thrMgr_ != 0)
    this->thrMgr_->wait();
  ACE_Thread::exit(0);
}


/*[ Change header ---------------------------------------------------------

   Date         : 26. Jun 1996
   Version      : -
   Charm        : -
   Author       : D. Quehl (Qu); Siemens AG B Med CSA

   Description  : Initial release

}----------------------------------------------------------------------------*/


/*[ Change header ---------------------------------------------------------

   Date         : 07. Jul 1996
```

```
   Version     : 1.1
   Charm       : 2041
   Author      : D. Quehl (Qu); Siemens AG B Med CSA

   Description : Changes in respect to code review component
                 "osc - generic main - 03.jul.96 "

}----------------------------------------------------------------------*/
```

```
/*[ Compilation unit ----------------------------------------------------

   Component       : CSA -

   Name            : CsaGenericMain.h

   Author          : (D. Quehl, BNEP11, +49 9131 84 2430); Siemens AG B Med CSA

   Language        : C/C++

   Creation Date   : 19-JUN-1996

   Test State      :

   Description     : Add on to Generic Main functionality.
                     Definition of libray startup/rundown functionality.

   Requirement Key : os_os_process_mgr


----------------------------------------------------------------------------*/
/*] END */
#ifndef CSAGENERICMAIN_H
#define CSAGENERICMAIN_H

#pragma comment ( exestr,"@(#) CsaGenericMain.h 1.4 (10 Jul 1996)  test: Definition Generic Main" )

#include <osc/CsaGenericMainBas.h>

// Header files of Singletons
#include <osc/CsaSesam.h>
#include <osc/CsaMscCommu.h>
#include <osc/CsaOsSystem.h>
#include <osc/CsaPmgtCmdIf.h>


/*[ Class ---------------------------------------------------------------

   Name            : CsaGenericMain

   Description     : CsaGenericMain is a friend class of a couple of
                     basic libraries all designed using the singleton
                     pattern with a private constructor/destructor and
                     destroy() method. These singletons will be instantiated
                     in the open method of CsaGenericMain and destroyed
                     (in reverse order) in the close() method.

----------------------------------------------------------------------------*/
class CsaGenericMain : public CsaGenericMainBas {

public:

  // Constructor
  CsaGenericMain(int argc, char *argv[])
```



```
    : CsaGenericMainBas(argc,argv) {}

  // The openHook() method is called by the svc() method and instantiates
  // all singletons the generic main provides for the component DLLs.
  virtual int openHook (void);

  // The closeHook() method is called by the svc() method to close up
  // all singletons the generic main provided for the components
  // (reverse order).
  virtual int closeHook (void);

  // Instances of of singletons
  CsaMscCommu    *commu_;
  CsaSesam       *sesam_;
  CsaOsSystem    *os_;
  CsaPmgtCmdIf   *rti_;

};

/*] END Class */


#endif  //ifndef CSAGENERICMAIN_H


/*[ Change header -------------------------------------------------------

   Date         : 26. Jun 1996
   Version      : -
   Charm        : -
   Author       : D. Quehl (Qu); Siemens AG B Med CSA

   Description  : Initial release

]----------------------------------------------------------------------------*/
```

```
/*[ Compilation unit ----------------------------------------------------

   Component       : CSA -

   Name            : CsaGenericMain.cpp

   Author          : (D. Quehl, BNEP11, +49 9131 84 2430); Siemens AG B Med CSA

   Language        : C/C++

   Creation Date   : 19-JUN-1996

   Test State      :

   Description     : Add on to Generic Main functionality.
                     Implementation of libray startup/rundown functionality.

   Requirement Key : os_os_process_mgr, os_os_test_testability


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-----------------------------------------------------------------------------*/
/*] END */

#pragma comment ( exestr, "@(#) CsaGenericMain.cpp 1.4 (10 Jul 1996)  test: Implementation Generic Main" )

#include <osc/CsaGenericMain.h>

/*[ Method --------------------------------------------------------------

   Name            : CsaGenericMain::openHook

   Description     : The openHook() method is called by the svc() method and
                     instantiates all singletons the generic main provides
                     for the component DLLs.

   Return          : 0                         success
                     -1                        error

-----------------------------------------------------------------------------*/
int CsaGenericMain::openHook (
                            void            // takes no arguments
                            )

/*] END Method */

{
  CSA_TRACE_IN ((CSA_OSC, "int CsaGenericMain::openHook"));

  this->sesam_ = CsaSesam::sesam();
  if (this->sesam_ == 0) {
    CSA_STATUS_GMAIN(NOMEM_NEW);
  }
  this->commu_ = CsaMscCommu::commu();
  if (this->commu_ == 0) {
```



```
    CSA_STATUS_GMAIN(NOMEM_NEW);
  }
  this->os_ = CsaOsSystem::csaOsSystem();
  if (this->os_ == 0) {
    CSA_STATUS_GMAIN(NOMEM_NEW);
  }
  this->rti_ = CsaPmgtCmdIf::csaPmgtCmdIf();
  if (this->rti_ == 0) {
    CSA_STATUS_GMAIN(NOMEM_NEW);
  }
  return 0;
}

/*[ Method --------------------------------------------------------------

   Name            : CsaGenericMain::closeHook

   Description     : The closeHook() method is called by the svc() method and
                     destroys all singletons the generic main provided for the
                     components (reverse order).

   Return          : 0                         success
                     -1                        error

-----------------------------------------------------------------------------*/
int CsaGenericMain::closeHook (
                            void            // takes no arguments
                            )

/*] END Method */

{
  // close down singletons

//  cout << "CsaGenericMain::closeHook>>> closing down libraries" << endl;

//  cout << "CsaPmgtCmdIf" << endl;
  this->rti_->destroy();

//  cout << "CsaOsSystem" << endl;
  this->os_->destroy();

//  cout << "CsaMsc" << endl;
  this->commu_->destroy();

//  cout << "CsaSesam" << endl;
  this->sesam_->destroy();


//  cout << "CsaGenericMain::closeHook>>> closing down libraries finished" << endl;

  return 0;
}

/*[ Change header -------------------------------------------------------
```

```
   Date        : 26. Jun 1996
   Version     : -
   Charm       : -
   Author      : D. Quehl (Qu); Siemens AG B Med CSA

   Description : Initial release

}--------------------------------------------------------------------------*/


/*[ Change header ---------------------------------------------------------

   Date        : 07. Jul 1996
   Version     : 1.1
   Charm       : 2041
   Author      : D. Quehl (Qu); Siemens AG B Med CSA

   Description : Changes in respect to code review component
                 "osc - generic main - 03.jul.96 "

]--------------------------------------------------------------------------*/
```

5. Welche Dienststellen sind an der Erfindung interessiert? _____ Aktenzeichen der GR PA _____

6. Wurde die Erfindung bereits erprobt (Durchführung von Versuchen, Anfertigung von Mustern)?

☐ nein ☐ ja, Ergebnis: _____

7. Für welche Erzeugnisse ist die Erfindung anwendbar? _____

8. Ist die Anwendung der Erfindung vorgesehen?

☐ nein ☐ ja, bei: _____

9. Ist ein auf der Erfindung beruhendes Erzeugnis geliefert oder ist eine Lieferung beabsichtigt?

☐ nein ☐ ja, am _____ Bezeichnung des Erzeugnisses: _____

10. Ist eine Veröffentlichung der Erfindung beabsichtigt oder bereits erfolgt?

☐ nein ☐ ja, am _____ in Buch, Zeitschrift: _____

11. Ist eine Mitteilung der Erfindung an Firmenfremde beabsichtigt oder bereits erfolgt?

☐ nein ☐ ja, am _____ an _____

12. Angaben zur Person des/der Erfinder/s (für jeden Erfinder ist eine senkrechte Spalte vorgesehen):

Name	Dr. Schmidt			
Vorname	Douglas C.			
akad. Grad/Titel/Beruf				
Dienstanschrift	Washington Univ. Department of Comp. Science			
Tätigkeit/Stellung im Betrieb (z.B. Laborvorsteher u.ä.)	Assistant Professor			
Hausanruf	/			
Staatsangehörigkeit	US			
Postleitzahl, Wohnort	Campus Box 1045 One Brookings Drive St. Louis, Missouri			
Straße, Haus-Nr.				
Geburtsdatum	18.7.1962			
Abrechnende Personaldienststelle oder APD-Nr. *)				
Personalnummer *)	/			
13. Liegt die Erfindung auf a) Ihrem Arbeitsgebiet? b) einem anderen Arbeitsgebiet Ihres Arbeitgebers?	☐ ja ☐ nein ☐ ja ☐ nein	☐ ja ☐ nein ☐ ja ☐ nein	☐ ja ☐ nein ☐ ja ☐ nein	☐ ja ☐ nein ☐ ja ☐ nein
14. Welchen Anteil an der Erfindung haben Sie?	20 %			
15. Wurde die Erfindung als V V gemeldet?	☐ ja ☒ nein	☐ ja ☐ nein	☐ ja ☐ nein	☐ ja ☐ nein
16. Falls Sie die Erfindung als freie Erfindung ansehen, bitte begründen:				
17. Meines/unseres Wissens sind keine weiteren Personen an der Erfindung beteiligt.	Douglas C. Schmidt Unterschrift	Unterschrift	Unterschrift	Unterschrift
Vermerke der GR PA				

*) Bitte aus Firmenausweis oder Gehaltsabrechnung entnehmen

5. Welche Dienststellen sind an der Erfindung interessiert? _____

Aktenzeichen der GR PA: 96E 8553

6. Wurde die Erfindung bereits erprobt (Durchführung von Versuchen, Anfertigung von Mustern)?

☐ nein ☒ ja, Ergebnis: gut

7. Für welche Erzeugnisse ist die Erfindung anwendbar? für jegliche Art von Main()-Programmen

8. Ist die Anwendung der Erfindung vorgesehen?

☐ nein ☒ ja, bei: MED CSA Project

9. Ist ein auf der Erfindung beruhendes Erzeugnis geliefert oder ist eine Lieferung beabsichtigt?

☐ nein ☒ ja, am 01/97 Bezeichnung des Erzeugnisses: _____

10. Ist eine Veröffentlichung der Erfindung beabsichtigt oder bereits erfolgt?

☒ nein ☐ ja, am _____ in Buch, Zeitschrift: _____

11. Ist eine Mitteilung der Erfindung an Firmenfremde beabsichtigt oder bereits erfolgt?

☐ nein ☐ ja, am _____ an _____

12. Angaben zur Person des/der Erfinder/s (für jeden Erfinder ist eine senkrechte Spalte vorgesehen):

Name	Dorn	Quehl (Diehl)	Becker	Scharf
Vorname	Karlheinz	Dieter	Detlef	Christian
akad. Grad/Titel/Beruf	Dipl.-Informa.	Dipl.-Ing.	Dipl.-Ing.	Dipl. Ing
Dienstanschrift	MED BNSW-ART	MED BNSW-ART	MED BNSW-ART	MED BNSW-Art
Tätigkeit/Stellung im Betrieb (z.B. Laborvorsteher u.ä.)	Gruppenleiter	SW-Entwickler	SW-Entwickler	SW-Entwickler
Hausanruf	8187	2430	8305	7218
Staatsangehörigkeit	deutsch	deutsch	deutsch	deutsch
Postleitzahl, Wohnort	90562 Kalchreuth	91052 Erlangen	91096 Möhrendorf	91074 Herzogenaurach
Straße, Haus-Nr.	Erlenstr. 29	Nürnberger Str. 83	Wasserweg Str. 10	Siedlung 10
Geburtsdatum	18.9.56	12.4.55	19.1.60	27.06.43
Abrechnende Personaldienststelle oder APD-Nr. *)	052	052	052	052
Personalnummer *)	465559	174637	420611	194 129
13. Liegt die Erfindung auf a) Ihrem Arbeitsgebiet? b) einem anderen Arbeitsgebiet Ihres Arbeitgebers?	☐ ja ☐ nein ☐ ja ☐ nein	☐ ja ☐ nein ☐ ja ☐ nein	☐ ja ☐ nein ☐ ja ☐ nein	☐ ja ☐ nein ☐ ja ☐ nein
14. Welchen Anteil an der Erfindung haben Sie?	20 %	20 %	20 %	20 %
15. Wurde die Erfindung als V V gemeldet?	☐ ja ☒ nein	☐ ja ☒ nein	☐ ja ☒ nein	☐ ja ☒ nein
16. Falls Sie die Erfindung als freie Erfindung ansehen, bitte begründen:				
17. Meines/unseres Wissens sind keine weiteren Personen an der Erfindung beteiligt.	Unterschrift	Unterschrift	Unterschrift	Unterschrift
Vermerke der GR PA				

*) Bitte aus Firmenausweis oder Gehaltsabrechnung entnehmen